















QM-FM Condenser gluing procedure

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7 Condenser gluing procedure sheets for FM condensers

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bottom plate/top plate/strain relief bottom/strain relief top plate	Sandblasting aluminium plates:		Record grit material used 180-220 dry grit		Record sandblast equipment used &		Take out and store in a Kraft paper		Put all the plates in a container for the degreasing	bottom plate/top plate/strain relief bottom/strain relief top plate	Degrease aluminium plates:	Record degrease equipment used		Record model (FM) for which the gluing preparations are prepared	Action	Fill in by hand.	Condenser gluing procedure sheet
		size/material	Manufacturer/grit	type/serial number	Manufacturer,									Model	Monitoring		
			180/220-Al2O3	N= 99118-6 LODEL	- SHANG - GO SANDER									PW/SR(SW)/PR	Value	engineer: Shyok	company: AIDC
		Bl203	180	roper	SANDER	01		2					Fr. h	SE	Result		
DECEMBER 1212 00	FERTORNEY 6N			7M-R6H POWER 50220V	CO. LTP					In OECEMBER 10th of	PZRFIORMED ON				Comment	location: AZPC	9















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7.	16.		<u></u>	ند.	i2	=			9.	Step		
Vapour degreasing the TUBES with Trichloroethylene at 185-195°F (85-90.5 °C)	Verify the manifold tubes are closed with Swagelok connectors	SURFACE TREATMENT INCONEL 718 TUBES	Verify all gluing can be performed within 8 hours after following surface treatments	Verify glue/adhesive expiry date	SURFACE TREATMENT AND GLUING (should be done within 8 hours!!)	Store in a clean and dry place for further processing	Remove all sanding residue by blowing dry oil-free air	 (gluing side) top plate (grooved side) bottom strain relief plate (gluing side) top strain relief plate 	Sandblast with 45 psi: • (grooved side) bottom plate	Action	Fill in by hand.	Condenser gluing procedure sheet
		Record start time	4	Record expiry date					Pressure	Monitoring		
				> date of application					45 psi	Value	engineer:	company:
			ok.	Jo Jamar		oK	sk		15924	Result		
sortue treatment of tubes	Following same process	PROCESS PERHORMED ON		5 Kg						Comment	location:	date:
<u></u>		100		v	1							

















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12	1.0	20.		·						Ş	- 80	Step		
Dry in oven at not over 93 °C	Spray rinse with DI water at RT	water not over 65 °C	7. Etching rate: 0.24 ~ 0.50 mils/surface/hr	6. C1: 300 ppm max	5. Cr+3:1.9%/wmax	4. Cu : 150 mg/l min	3. Al: 1.5 g/l min	2. Na2Cr2O7: 59 ~ 90 g/l	1. H2SO4: 276 ~ 313 g/l	sulfuric acid dichromate (the same that will be <u>used for preparing</u> <u>aluminium</u>):	deep enough to immerse the tubes in the bottom plate AND the strain relief tubes	Action	Fill in by hand.	Condenser gluing procedure sheet
	Record temperature and time	Record temperature and time								Record temperature		Monitoring		
		50°C				acid.	weight\	acid, and	acid, weight	145 °F (62.5°C) Record weight hydrochloric		Value	engineer:	company:
												Result		
												Comment	location:	date:
								****				<u> </u>		













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	29.	28.	27.	26.	25	24.	23.	Step		
2. Na2Cr2O7::59~90 g/l 3. Al::1.5 g/l min 4. Cu::150 mg/l min 5. Cr+3::1:9%/wmax	Immerse plates for 12-15 minutes at 151-160 °F (66-71 °C) in the following acid solution: 1. H2SO4: 276 ~ 313 g/J	Spray rinse with DI water at RT	Put the plate in a bath with DI water and hot rinse thoroughly with water at 110-130°F (43-54) °C	Perform Hot AlKaline with Turco-4215S at 135-145°F (57-63 °C)	Vapour degreasing the plates with Trichloroethylene at 185-195°F (85-90.5 °C)	SUPPORT TOOL (pressure tubes, positioning pins, pressure plate, bonding plate, bonding tool pocket)	Put tubes in a Kraft paper, in a clean dry place. Handle all parts as little as possible and only with clean, lint free cotton or nylon fabric gloves	Action	Fill in by hand.	Condenser gluing procedure sheet
dichromate/ Record temperature/record time	Record weight acid solution, weight sulfuric acid and sodium	Record temperature and time	Record temperature and time					Monitoring		
155.3 °F (68.5 °C)/13.5 min								Value	engineer:	company:
5								Result		
					surface treatment time	PERHORMED ON LOTE January	Frish time Joso A	Comment	location:	date:

















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37.	36.	3	ن 4-	Ċ1	13	31.	30.	<u> </u>	Step	*	
Put tubes in the Aluminium plate and apply aluminium tape on the surface of the tubes that comes out from the condenser (only for few cm). Then take out the tubes.	Put the aluminium bottom plates and Inconel tubes on a clean working table	thesadispenser medies 331 550 tang 301 5490 tang pulsip water to	APPLYING THE ADHESIVE	Put the plates in a Kraft paper, in a clean dry place. Handle all parts as little as possible and only with clean, lint free cotton or nylon fabric gloves	Dry in oven	Spray rinse with DI water at RT	Put the plates in a second bath with DI water and rinse thoroughly with water not over 149 $^{\circ}$ F(65 $^{\circ}$ C)	6. C1: 300 ppm max 7. Etching rate: 0.24 ~ 0.50 mils/surface/hr	Action	Fill in by hand.	Condenser gluing procedure sheet
						Record temperature and time	Record temperature and time		Monitoring		
							122°F (50°C)		Value	engineer:	company:
o K	70				\				Result		
TO PREVENT GLUE ON THE INLET AND OUTLET TUBES				Tinish time: 1:30 am					Comment	location:	date:

















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1995 (Precios 1991)	Banktiya, Acia	iana ya jiga w				Step /	
		taken out to remove the exceeding glue.	Put adhesive tape 3M 5490 on the border line, on bottom side and in the central reducing mass holes of bottom aluminium plates. The tape will be			Action	Condenser gluing procedure sheet
<u>:. </u>		-		. :			
		antiestre tabe	Record type		MOUTOTHE		
					value	engineer:	company:
		ox			Result		
USEP SATINT-GORIN x2 37 on Botton Plate	Because too difficult	of 12. The smoto			Comment	location:	date:
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4	40,		39,	Step		
Read and follow the instructions of the manufacturer for the adhesive MASTERBOND EP21TDC-2LO, especially wrt mix ratio and working life (90min). To be used only the amount of glue foreseen for 1 QM/FM	Gille tubes to bottom plate	Shorter PINS	Full release agent on aluminium positioning pins and position it	Action	Fill in by hand.	Condenser gluing procedure sheet
Record Mixing ratio applied			Record release agent used	Monitoring		
				Value	engineer:	company:
{ 5 2 }				Result		
Mixing Time				Comment	location:	date:
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<u>ئ</u>				# <u>*</u>	Į.	Step	,	4+
Apply the glue on the bottom of the pockets and in the edges (of bottom plate) carefully by a gun with a tip dispenser of approximately 0.9mm.	relax (at least 15 minutes)	 Pull a vacuum, repeatedly, i.e. pull-relax, pull-relax, pull- 	new amount of glue is mixed: • Mix the A and B compound	To avoid bubble air in the glue, perform the following for each time a	bottom condenser plate.	Action	Fill in by hand.	Condenser gluing procedure sheet
Record time of application of glue						Monitoring		
						Value	engineer:	company:
° ₹			2			Result		
START Gluing 13:35		× 13 × 26	Himish time for vacaum			Comment	location:	date:
13:35	-		VACQUIM			~		

















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Put also a small layer of glue in the grooves, always with the cut tip dispenser. However put no glue on the grooves for bonding top plate "teeth":these parts are for pushing the tubes in right position and should have no glue.	Cut with a slope the tip dispenser to enlarge the gluing area and fill the bottom of the pockets completely.	Action	A A	Connectiset Etatus brocedure sneet	Condensor riving passages at the
		Monitoring			
		Value	engineer:	company:	
7	0 K	Result			
		Comment	location:	date:	
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÷ :	(COMPANIA) Friedrich Margentinister (1 to 2 Junior 1 Province (1 to 2 Junior 1 Province (1 to 2 Junior 1 Province (1 to 2 Junior 1 To 2 Junior	Step		
Put the tubes and press them in place using the tubes frame (they will be used very temporarily). Use rulers/knives and press them by hand. (see appendix A for drawings and sketches)		Action	Fill in by hand.	Condenser gluing procedure sheet
		Monitoring		
		Value	engineer:	company:
6 K	Ø K	Result		
		Comment	location:	date:
		2_		



















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4.	46	. step		
Gently remove the rulers or frame which press the tubes into the plate		Action	Fill in by hand.	Condenser gluing procedure sheet
	Noninormag	Monitoring		
	value	Volus	engineer:	company:
*	Result			
	Comment	TOCALIOII.	location:	date:
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50	49.	-	48.	Step		
Put a release film over the surface of the bottom plate and position the bonding plate over the bottom plate, using the position pins	Remove, where possible, the exceeding glue	llatten the surface. Try to keep the layer thickness ≤0.5 mm	Completely fill the bottom plate with cut tip dispenser and a spatula to	Action	Fill in by hand.	Condenser gluing procedure sheet
				Monitoring		
				Value	engineer:	company:
×	76	0/		Result		
5 m/d ~	Fraish Glaing in 14-40			Comment	location:	date:
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<u>.</u>	<u>*</u>	Step		
Insert the bottom strain relief (covered with the release film) over the bonding top plate, using 2 positioning screws, to support the tubes during the vacuum bag and to prevent excessive bending of the tubes.		Action	I'll in by hand.	Condenser gluing procedure sheet
ac o		Monitoring		
		Value	engineer:	company:
2		Result		
		Comment	location:	date:
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Condenser gluting procedure sheet Fill in by hand. Step Action Action Position the pressure plate over the top bonding plate (no nurphetes are present in this step). NOTE: THE PRESSURE PLATE HAS BEEN MODERATE DALLOW PINS GO THROUGH. MODERATO ALLOW PINS GO THROUGH.		 <u> </u>		· · · · · · · · · · · · · · · · · · ·	\ <u>\</u>		
by hand. by hand. by hand. Monitoring Value Result Comment In this step). NOTE: THE PRESSURE PLATE HAS BEEN BEEN BEEN BEEN BEEN BEEN BEEN BEE							-
company: engineer: Value Result Comment		present in this step). NOTE: THE PRESSURE PLATE HAS BEEN NODEFIED TO ALLOW PINS GO THROUGH	Position the pressure plate over the top bonding plate (no nutplates are			Fill in by hand.	Condenser gluing procedure sheet
Result Comment					Monitoring		
date: location: Comment					Value	engineer:	company:
		ok			Result		
					Comment	location:	date:
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56	9) 9)	ار شاب	Or Su		Step		
Raint the contact surface between nutplate and top plate holes with Super Koropon Primer Base 515-700 (Don't add MEK, just use small amount of Super Koropon in a little cup and then refill when finished). Install the 88 nutplates using the installation tool DCBT8600-06	procedure of the Bottom plate (from step to 28 to 36).	TOP PLATE	Put all the assembly on a vacuum bag and cure for 1 day		Action	Fill in by hand.	Condenser gluing procedure sheet
					Monitoring		
					Value	engineer:	company:
			· *		Result		
Start Installation at 8. 20 and	surface treatment is prepared by DIDC	Pate: 24 21, January, 2009		COMMINGE	Comment	location:	date:
J. D. and	red by P.	yas			٤		















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Over the nutplates	 On the TS and heaters location 	 in the central reducing mass holes 	To the border line	57. Apply 3M 5490 tape on top plate:	.020MAX	Super Koropon	Marine Ma		THK.	GRIP	Step Action	Fill in by hand.	4 Condenser gluing procedure sheet
											Monitoring		
											Value Result	engineer:	company:
						· control the primer	of nutplate "	Meck the Hosting	9:00 am	Junish time of	Comment	location:	date:















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		20		Step		
NO TAPE ON: STRAIN RELIEF PIN POSITION	(Inner side, the one that will be glued) as in the following picture (only for square size reference).	The tape will be taken out to remove the exceeding glue. Apply small square size pieces of the 3M 850 on holes of the top plate.	Tape:3M-5490	Action	Fill in by hand.	Condenser giuing procedure sneet
				Monitoring		
					engineer	company:
	0 K	ok	7	Result		
				Comment	location:	date:















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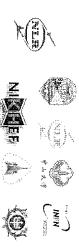
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				.75											Step		
* the release film	• the bonding top plate	the bottom strain relief,	• the short pins on the strain relief side	open the vacuum bag and remove:	(STRAIN RELIEF SIDE) and GLUING TOP PLATE TO BOTTOM PLATE.										Action	Fill in by hand.	Condenser gluing procedure sheet
														S. C.	Monitoring		
								-						, arac	Value	engineer:	company:
		o X			o/K									TUCOMI	Dasmit		
					cos/ funnacy/re									Comment	Commont	location:	date:
	* the release film		* the bottom strain relief, * the bonding top plate * the release film Check if voids are in the chirac surface and the chirac surface are in the chirac surface.		open the vacuum bag and remove: the short pins on the strain relief side the bottom strain relief, the bonding top plate the release film Check if voids are in the chains conference and the chains are in the chains are in the chains and the chain and the chains are in the chains are in the chain and the chain are the chain ar	Check if voids are in the gluing curfect with the first state of the strain relief side.	RE-FILLING CHECK, INSTALL FOIL HEATERS ON TOP plate (STRAIN RELIEF SIDE) and GLUING TOP PLATE TO BOTTOM PLATE- open the vacuum bag and remove: the short pins on the strain relief side the bottom strain relief, the bonding top plate the release film Check if voids are in the chains curface with a strain that the strain the strain that the strain the strain that the strain t	RE-FILLING CHECK, INSTALL FOIL HEATERS ON TOP plate (STRAIN RELIEF SIDE) and GLUING TOP PLATE TO BOTTOM PLATE. open the vacuum bag and remove: the short pins on the strain relief side the bonding top plate the bonding top plate the release film (Theek if voids are in the chains curfer with a large in the chain cu	RE-FILLING CHECK, INSTALL FOIL HEATERS ON TOP plate (STRAIN RELIEF SIDE) and GLUING TOP PLATE TO BOTTOM PLATE. open the vacuum bag and remove: the short pins on the strain relief side the bottom strain relief, the bonding top plate the release film	RE-FILLING CHECK, INSTALL FOIL HEATERS ON TOP plate (STRAIN RELIEF SIDE) and GLUING TOP PLATE TO BOTTOM PLATE- epen the vacuum bag and remove: the short pins on the strain relief side the bottom strain relief, the bonding top plate the release film Check if voids are in the obline curface.	RE-FILLING CHECK, INSTALL FOIL HEATERS ON TOP plate (STRAIN RELIEF SIDE) and GLUING TOP PLATE TO BOTTOM PLATE. open the vacuum bag and remove: the short pins on the strain relief side the bottom strain relief, the bottom strain relief, the release film Check if yorlds are in the fluing offer.	RE-FILLING CHECK, INSTALL FOIL HEATERS ON TOP plate (STRAIN RELIEF SIDE) and GLUING TOP PLATE TO BOTTOM PLATE. Open the vacuum bag and remove: • the short pins on the strain relief side • the bonding top plate • the release film Check if world were in the chirac are for with the plane of the plane	RE-FILLING CHECK, INSTALL FOIL HEATERS ON TOP plate (STRAIN RELIEF SIDE) and GLUING TOP PLATE TO BOTTOM PLATE. open the vacuum bag and remove: the short pins on the strain relief, the bottom strain relief, the bonding top plate the release film check if world sees in the delation current.	RE-FILLING CHECK. INSTALL FOIL HEATERS ON TOP plate (STRAIN RELIEF SIDE) and GLUING TOP PLATE TO BOTTOM PLATE. The short pins on the strain relief side the bonding top plate the release film the release film the strain relief.	RE-FILLING CHECK, INSTALL FOIL HEATERS ON TOP plate (STRAIN RELIEF SIDE) and GLUING TOP PLATE TO BOTTOM PLATE. • the short pins on the strain relief side • the bottom strain relief, • the bottom strain relief, • the bottom strain relief. • the bottom strain relief side • the bottom strain relief.	Action Action Monitoring Value Result Result REFILLING CHECK, INSTALL FOIL HEATERS ON TOP plate (STRAIN RELIEF SIDE) and GLUING TOP PLATE TO BOTTOM PLATE. The short pins on the strain relief side the bottom strain relief, the bottom strain relief, the bottom strain relief side the release film Check if world are in the followed for the films of the strain the films of the strain the films of the strain	Action Action Action Monitoring Value Result (Control of the Value of the Strain relief side The Monitoring of the Strain relief side RE-FILLING CHECK, INSTALL FOIL HEATERS ON TOP plate (STRAIN RELIEF SIDE) and GLUING TOP PLATE TO BOTTOM (PLATE) The Short pins on the strain relief side The Short pins on the strain relief side



















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			5	 	Step		
 #2 condenser foil heater -HK 27565 Kapton Thermofoil heater (yellow in the picture) 	(red in the picture)	 #2 liquid line foil heaters -FHK203 Kapton Thermofoil heater 	Install the foil heater on top plate:		Action Action	Fill in by hand.	Condenser gluing procedure sheet
,		7			Monitoring		
					Value	engineer:	company:
0				ok	Result		
					Comment	location:	date:
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64.	9.		 62	Step		<u> </u>
Protect the HK 27565 heater and cable with release film according to the following schematic, using release film and tape to fix.	Install heaters according to AMSTR_NLR_PR-043 procedure	heaters have to be installed.	Remove the tape on the top plate on the strain relief side, where the	Action	Fill in by hand.	Condenser gluing procedure sheet
				Monitoring		
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5.	Siep		
Cabling: wrap release film around Release film fix with tape following schematic. using release film and tage to fix Release film area: fix with tape	Action	Fill in by hand.	Condenser gluing procedure sheet
	Monitoring		
	Value	engineer:	company:
6 A	Result		
only one prece of release film over the overall length of the heaters	Comment	location:	date:















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70,	69.	68.	07.	95.	4	Step	
Apply the bonding tool pocket	plate, with positioning screws, to support the tubes during the vacuum bag and to prevent excessive bending of the tubes.	Position top plate on bottom plate within accuracy by using D=5mm positioning pins.	Apply the adhesive MASTERBOND EP21TDC-2LO according to manufacturers instructions on the top plate	Use tape to fix the heater cable to the plate, to avoid stressing the foil heater wire connection	Release film area: fix withtape Cabling: wrap release film around	Action	Fill in by hand.
			Record Mixing ratio applied			Monitoring	
			D=B			Value	company: engineer:
90	2/9	o X	ok	40	*	Result	
						Comment	date: location:
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2	72.			Step		
SURFACE TREATMENT OF BOITOM AND TOP STRAIN RELIEVES AND NUTPLATE INSTALLATION Open the vacuum bag, remove the pressure plate and the tape from the top plate surface	Put all the assembly on a vacuum bag and cure for 1 day	Position the pressure plate over the top plate NOTE: THE PRESSURE PLATE HAS BEEN MODIFIED TO ALLOW PINS GO THROUGH.	5. 4 to 1. 6 t	Ac	Fill in by hand.	Condenser gluing procedure sheet
				Monitoring		
				Value	engineer:	company:
0	73	8	×	Result		
installation intolate =	Jaish = 10.50			Comment	location:	date:
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77.		 	<u></u>	75. 76.	7	Siep		
Remove the nut on the nutplates that will be used for the positioning screws, using the removal tool	Super Koropon O20MAX -	TOP G1 PANEL GRIP THK.	with Super Koropon Primer Base 515-700 (Don't add MEK, just use small amount of Super Koropon in a little cup and then refill when linished). Install the 10 nutplates using the installation tool DCBT8600-	Paint the contact surface between nutplate and TOP strain relieves Paint the contact surface between nutplate and TOP strain relief holes	Remove the PINS only strain relieves side.	·	Fill in by hand.	Condenser gluing procedure sheet
						Monitoring		
						Value	engineer:	company:
			0	Š		Result		
remove only snuts.		MY SS. 0	twist: D: ES AN	Frish time s 7:00 Ar		Comment	location:	date:

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78.		Step		
Clean inlet tubes on the pocket area	Positioning screw location	Action	Fill in by hand.	Condenser gluing procedure sheet
		Monitoring		
		Value	engineer:	company:
		Result		
		Comment	location:	date:
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2	\$ 3	·	Step		
	the bottom and top strain relieves (on the area where heaters will be installed) Apply small square size pieces of the 3M 850 on bolos of the better.		cp Action	Fill in by hand.	Condenser gluing procedure sheet
			Monitoring		
			Value	engineer:	company:
01	ok		Result		
			Comment	location:	date:
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<u>≈</u>	 Step	ļ	
relief (Inner side, the one that will be glued): don't put the tape on the positioning screw holes.	Action	Fill in by hand.	Condenser gluing procedure sheet
	Monitoring		
o K	Value Result	engineer:	company:
	:	location:	date:
	<u></u>		

















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84.	<u>-</u>	8	82	Step	
Position and assemble the bottom strain relief on top plate, avoiding tubes touch the glue. Put the 2 positioning screws from the bottom side of the condenser to let the bottom strain relief be in the right position.	Release film Tape Tape	Cover the strain relief as in the following picture to protect the foil heaters already installed	Apply the adhesive MASTERBOND EP21TDC-2LO according to manufacturers instructions, in the grooves and all the internal surface of the bottom strain relief.	Action	Condenser gluing procedure sheet Fill in by hand.
			Record Mixing ratio applied	Monitoring	
				Value	company: engineer:
6K				Result	
No need,				Comment	date: location:
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85.		Step		
Press tubes into bottom strain relief and refill a new glue layer		Action	Fill in by hand.	Condenser gluing procedure sheet
		Monitoring		
		Value	engineer:	company:
0/		Result		
	The the bottom strain relief place,	Comment	location:	date:
		2		

















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3	 	· · · · · · · · · · · · · · · · · · ·	Step]
re le	86. Apply		cp Action	FII	Cone
relief to bottom strain relief	Apply a layer of 0.5 mm glue on the top strain relief and put the top strain		011	Fill in by hand.	Condenser gluing procedure sheet
)m strail	r of 0.5			ınd.	gluing p
n reliet	mm glue				rocedu
	on the				re sheet
	top stra				
	in relief				
	and put				
	the top				
	strain				
			Monitoring		
			ring		
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			Value	engineer:	company:
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0		0 7	Result		
			Comment	location:	date:
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	87.	Step		
Press top strain relief to bottom strain relief	Apply 4 positioning screws from the nutplate side on the top strain Positioning Screw elief Positioning	Action	Fill in by hand.	Condenser gluing procedure sheet
		Monitoring		
		Value	engineer:	company:
	~	Result		
	swide Ano	Comment	location:	date:
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3		89.	*	Step	The state of the s	
layer layer	and apply to the nutplate side of top strain relief	Remove the 2 positioning screws from the bottom side of the condenser		Action	Fill in by hand.	Condenser gluing procedure sheet
<u> </u>		er		Monitoring		
				Value	engineer:	company:
7				Result		
<	In same	NA WALLEY		Comment	location:	date:
				7.		

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9		Step		
Put all the assembly on a vacuum bag for the time period mentioned by the adhesive manufacturer (2 OR 3 DAYS)	Strain relief plate Heavy bar	Action	Fill in by hand.	Condenser gluing procedure sheet
		Monitoring		
		Value	engineer.	company:
*		Result		
Fral ghe used =		Comment	location:	date:
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 <u></u>		S	T	1
Ş		Step		
Open the vacuum bag and check if the no voids are along the edges of the condenser. If so, refill using a syringe and needle to push the glue inside.	EDGE REFILLING CHECK	Action	Fill in by hand.	Condenser gluing procedure sheet
		Monitoring		
	-	Value	engineer:	company:
30		Result		
		Comment	location:	date:
		2		

















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100	99	98.	97.	96.	<u>.</u>	95.	94.	93.		Step		
End	Put the condenser on a balance and record the weight	WIEGHT RECORD	Remove the tape on the condenser plates	Apply the remaining foil heaters on top plate and top strain relief according to the procedure AMSTR-NLR-PR-043	INSTALLATION OF FOIL HEATERS ON TOP PLATE AND TOP STRAIN RELIEF	Drill the holes of the condenser to remove the glue inside (from bottom to top plate, to avoid going through the nutplate thread)	After curing time, remove the tapes and the pins from the condenser surface. Remove exceeding glue as better as it is possible.	Open the vacuum bag and perform visual inspection of the gluing	DRILLING THE HOLES	Action	Fill in by hand.	Condenser gluing procedure sheet
	Record the weight measured							Check glue thickness on sides		Monitoring		
4	60314	:						Uniform glue thickness on		Value	engineer:	company:
			Za	6K		6K	No	70		Result		
										Comment	location:	date:
										2		